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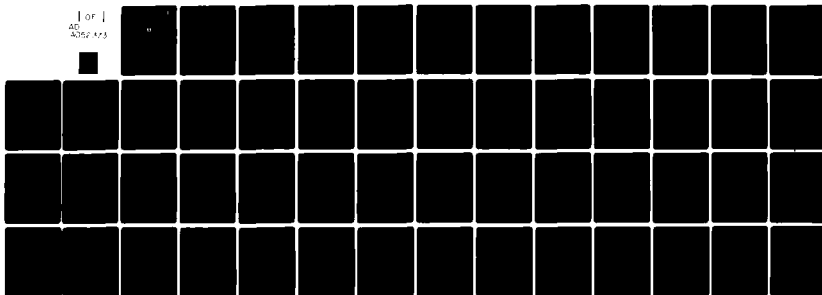
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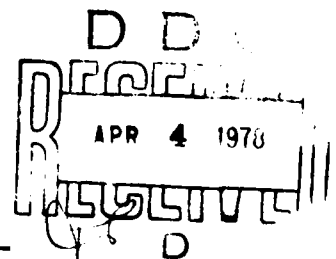


PROGRAM MANAGEMENT COURSE INDIVIDUAL STUDY PROGRAM

THE B-1 STRATEGIC BOMBER DSARC III

STUDY PROJECT REPORT
PMC 77-2

John T. Guttman
Major USAF



FORT BELVOIR, VIRGINIA 22060

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DEFENSE SYSTEMS MANAGEMENT COLLEGE

STUDY TITLE: THE B-1 STRATEGIC BOMBER DSARC III

STUDY PROJECT GOALS:

To describe the process and interaction of the complex elements of the Department of Defense, the Secretary of the Air Force, the Air Staff, Air Force Systems Command, Air Force Logistics Command, Strategic Air Command and the aerospace industry associate team as they prepare for DSARC III, the production decision, for the B-1 bomber. To describe how this program meets the goals and criteria of the governing acquisition policies of OMB Circular A-109 and the implementing Department of Defense Directives 5000.1 and 5000.2.

STUDY REPORT ABSTRACT:

The report reviews the Department of Defense policies relating to major system acquisition particularly focusing upon the preparations and requirements for the production decision of Milestone III. Based upon this policy framework it describes the processes hierarchy and the Air Force commands for Logistics and Training as well as the user Strategic Air Command. It describes the roles of the Air Staff the Secretary of the Air Force and his independent reviews and the action of the Department of Defense and in particular the offices for Test and Evaluation and the Cost Analysis Improvement Group.

The report also addresses the topics covered in the status reviews and the DSARC III briefing.

SUBJECT DESCRIPTORS: Program Management, Systems Acquisition Life Cycle (10.02.04)

Program Management, Planning and Control Systems, Program Milestone Reviews/Decisions (10.02.05.03)

NAME, RANK, SERVICE
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November 1977

THE B-1 STRATEGIC BOMBER DSARC III

Individual Study Program
Study Project Report
Prepared as a Formal Report

Defense Systems Management College
Program Management Course
Class 77-2

by

John T. Guttman
Major USAF

November 1977

Study Project Advisor
COL Robert E. Lucas, USAF

This study project report represents the views, conclusions and recommendations of the author and does not necessarily reflect the official opinion of the Defense Systems Management College or the Department of Defense.

EXECUTIVE SUMMARY

The report describes the DSARC III preparation for the B-1 Strategic Bomber and relates them to the general objectives and requirements of OMB Circular A-109 and the implementing directives of the Department of Defense. It specifically outlines the objectives associated with the Milestone III Production decision.

In a chronological sequence the report narrates the combined actions of the Office of the Secretary of Defense and the DSARC principles, the Secretary of the Air Force, the Air Staff, Air Force Systems Command, Air Force Logistics Command, and Strategic Air Command leading to the B-1 production decision.

The sequence begins with a status review in October 1975 in support of the FY 76 and 77 budget which contains B-1 long lead production funds. A subsequent status review was held in February 1976 to provide evidence to Congress, which was in hearings for the FY 1977 budget, that the Department of Defense was supporting the B-1 production and thus had incorporated more than \$1 billion in this budget for the first production lot of B-1 strategic bombers.

During the period February 1976 to December 1976 the seven years of B-1 full scale engineering development were coming to a close. The primary program office activity during those ten months is described.

Beginning in July and August 1975 concentrated effort began in the program office and throughout the Department of Defense to gather data for the DSARC III. DSARC principles visited contractors. The Secretary of the Air Force commissioned two reviews; one a technical assessment and the second an "alternatives" review. The Air Staff formed a General Officer Steering

Group and a general officer focal point was established in the Deputy Chief of Staff for Research and Development. This office orchestrated the actions throughout the Air Force supporting to the DSARC III.

The program office wrapped up the data gathering and prepared the DSARC III briefing. This briefing was presented in October and November 1975 to Strategic Air Command, the user, Logistics Command and to all levels in the Air Force and was finally presented to the DSARC principals on 1 December 1976.

A short summary describes three key aspects of this entire process; involvement of people from all levels in the B-1 program, production decision criteria, and production readiness reviews.

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SECTION I

INTRODUCTION

On 2 December 1976 after a morning session with the Defense Acquisition Review Council the Secretary of Defense issued a Memorandum for the Secretary of the Air Force.

"I have reviewed the results of the B-1 DSARC process concluded on 2 December 1976. The DSARC's findings were that the development, test, and production planning prerequisite to B-1 production have been satisfactorily accomplished. Their recommendation is that the B-1 is ready to move into production. Accordingly, the Air Force is authorized to proceed with production of the B-1." (21:1)

In addition to notifying the Air Force of the favorable production decision, the Department of Defense has the responsibility of informing Congress of major weapon system decision. Each of the Chairmen of the following committees: House Appropriations, Senate Appropriation, House Armed Services and Senate Armed Services were advised of the decision by a 2 December 1976 letter from the Director of Legislative Liaison, Department of the Air Force.

"Knowing of your interest in the future of the B-1 bomber program, we are pleased to inform you that the Secretary of Defense, after consultation with the President, today authorized the Air Force to initiate production of the B-1 strategic bomber. The decision followed an exhaustive review of the program progress by both the Secretary of the Air Force and by the Department's Defense System Acquisition Review Council." (16:1)

The B-1 weapon system had achieved a successful production decision. The development program was completed and the weapon system was sufficiently mature to be produced. The presentations to the DSARC took less than two hours but the preparations really began in June 1970, the start of the Full Scale Engineering Development (FSED) phase. The FSED program had lasted more than six years and the results of that effort were reduced to a substantive briefing conveying the program accomplishments.

These accomplishments had satisfied the Department of Defense policies and objectives in the 5000.1 and 5000.2 instructions and the basic policies of the Office of Management and Budget Circular A-109. The report addresses how the B-1 program satisfied these policies and goals and describes the DSARC III review which lasted nearly 15 months from October 1975 to November 1976. The report also describes the involvement of major participants of the Office of the Secretary of Defense, the Secretary of the Air Force, Headquarters Air Force, Air Force Systems Command, Air Force Logistics Command, and the user Strategic Air Command.

The report describes how DSARC III was conducted on a major program with high visibility. Who was involved? What were their roles? What information was necessary? The report can assist program managers facing a DSARC III review by providing empirical data on the above questions thus assisting them in the important planning for their DSARC III review.

SECTION II

THE DSARC PROCESS

OMB Circular A-109

The Office of Management and Budget Circular No. A-109 sets forth the policies for the executive branch agencies to be used in the acquisition of major systems. The circular provides administrative direction to heads of agencies recognizing a "most crucial and expensive" activity to meet national requirements. A major area of discussion is the management objectives for each acquiring agency. Highest among these objectives is that the system meets a mission need effectively with a demonstrated level of performance and reliability. Other objectives which must be satisfied include a review of alternative design concepts and a full examination of cost; including investment cost and ownership cost traded off with system schedules and performance characteristics. Adequate system test and evaluation throughout its development life cycle provides the basic data for decision-making. Another objective is to accomplish system acquisition planning and developing an appropriate acquisition strategy particularly noting the use of the contract types (24:8).

The final objective, relating directly to the DSARC process, requires continuous and thorough review of the system as it progresses through its life cycle. This review requirement is the responsibility of the agency head and four specific key decision points are identified:

- a. Identification and definition of a specific mission need to be filled, the relative priority assigned within the agency, and the general magnitude of resources that may be invested.

b. Selection of competitive system design concepts to be advanced to a test/demonstration phase or authorization to proceed with the development of a noncompetitive (single concept) system.

c. Commitment of a system to full-scale development and limited production.

d. Commitment of a system to full production (24:7).

The last of these key decisions will be reviewed as pertained to the B-1 program.

DOD Directives

Implementing OMB Circular A-109 is Department of Defense Directive 5000.1, Subject: Major System Acquisition dated 18 January 1977. It applies to designated major system acquisition programs which are recommended by DOD Component Head and OSD officials from those programs that have an anticipated cost of \$75 million in research, development, test and evaluation or \$300 million in production. Four key Secretary of Defense decision points are identified in DODD 5000.1 which correspond directly to the OMB Circular A-109. Major weapon system decision points, Milestone I, Demonstration and Validation; Milestone II, Full Scale Engineering Development; and Milestone III; Production and Deployment, require the review of the Defense System Acquisition Review Council (10:1-3) and the approval of the Secretary of Defense.

Current Department of Defense Directive 5000.2 also requires (Service) System Acquisition Review Council ((S)SARC) review all major system acquisition programs at Milestones I, II and III (11:5-6). Although the Secretary of the Air Force was not required to have such a review by the directives in force in the summer and fall of 1976, he did require two independent

reviews of the B-1 program to assure himself that indeed all requirements for production had been fulfilled.

Milestone III

The Production and Deployment decision point occurs at the end of the engineering development phase and after accomplishing some initial operational test and evaluation. Parallel to the review effort the Decision Coordinating Paper (DCP) is updated to recommend the commitment to produce and deploy the system. The DCP format delineated in DODD 5000.2 specifically requires that Milestone III DCPs include explicit cost, schedule and technical performance information (11:6-7). Based upon that information appropriate thresholds are determined for specific factors in each area which then require an explanation if they are breeched during the course of the program. Specific data areas to be reviewed during the DSARC for Milestone III are listed in Enclosure 2 to DODD 5000.2. This list is a basic guideline, and additional system peculiar items must be addressed to bring the total program into perspective. The DSARC review consists of an examination of the program with respect to that data required by DOD Directive and other unique program information.

SECTION III

B-1 FULL SCALE ENGINEERING DEVELOPMENT

Background

The guidelines or criteria which needed to be satisfied in order to meet Milestone III were derived during the life of the B-1 program. It began in earnest June 1970 after the approval of DSARC Milestone II - Full Scale Engineering Development. During this time, three B-1s were built and flight tested. A fourth research and development aircraft was approved for production in 1975. Parallel development of engines and a phased development of offensive and defense avionics rounded out the full scale engineering development program. The offensive avionics contract was awarded in April 1972 and provided for offensive avionics development and integration with selected government furnished avionics equipment. This contract also covered the integration of the offensive system with the defensive system. The defensive system contract was awarded in January 1974 and provided for the development of a radio frequency surveillance/electronic countermeasure subsystem (18:1).

Test Criteria

During the period from 1970 to 1975, through a series of status briefings such as the quarterly Secretary of the Air Force Program Reviews and functional reviews by Department of Defense Offices, a set of mutually agreed to criteria was established for test and evaluation which became known as the Starbird criteria (named after the then Deputy Director [Test and Evaluation], Director of Defense Research and Engineering, Lieutenant General Alfred D. Starbird) (5:1-6). Thus, the commitment of additional resources

to the program was based upon the successful accomplishment of specific test objectives.

Department of Defense Directive 5000.3 Test and Evaluation (T&E) (dated 20 May 75) establishes the T&E policies used by the military departments in the acquisition of weapons systems (12:2). In order to document the production decision goals, briefings presented in the November 1974 briefing to the Commander, Air Force Systems Command, Air Staff and to the Department of Defense, Director of Test and Evaluation were reviewed and a "B-1 Phase I Demonstrations and Success Criteria" was published (7:1-6). The purpose of this paper was to present in general terms objectives and demonstrations which were to be accomplished by the B-1 prior to a production decision. The objectives set forth in DOD Directive 5000.3 state that:

"The Development Test and Evaluation (DT&E) must be adequate to demonstrate that engineering is reasonably complete, that design problems are identified and that solutions to these problems are in hand."

The B-1 Development Test and Evaluation was designed to verify that engineering was reasonably complete through incremental component level testing, as well as air vehicle system and subsystem ground and flight tests. The identification of design problems in the test program was done in dedicated ground test and integration facilities on major subsystems such as; secondary power/inlets/engines and aircraft/avionics (7:8).

The total test program was geared to the early identification of engineering problems and extensive ground and flight tests were designed around the critical segments of the B-1 mission profile; alert launch, base escape, subsonic climb and supersonic cruise, aerial refueling, low altitude penetration, weapon separation, post-strike cruise and post-strike landing.

The T&E major areas of review during the DSARC process were derived

from the full scale engineering development program. These major test areas included: structural, engines and inlets, avionics, armament and aerodynamics performance. In addition, initial operational test and evaluation was done through the involvement of the Air Force Technical Evaluation Center, the Air Force independent test agency.

Structural Test

The structural test program was planned to demonstrate that the aircraft could withstand the operational flight loads as well as maintaining its strength through its projected life. The program was one of gradual buildup from material and component tests to determine if static and fatigue requirements could be met. Building upon test results, test specimens of full size of the aircraft structure were constructed and tested. Critical structural areas were selected representing the greatest challenges. Two of these which were static tested were the wing carry through, that portion of the fuselage to which the swing wings were attached, and the aft fuselage/empennage. This buildup philosophy culminated with the entry into test of the complete airframe of aircraft 2 which was statically proof tested to operation loads prior to its debut in flight test. Also, prior to production decision, fatigue testing was to begin also.

Engines and Inlets Test

The engines and inlets were tested for performance and compatibility beginning with full scale wind tunnel testing throughout the operational envelope. Flight testing of the Preliminary Flight Rating Test (PFRT) engines concentrated on demonstrating that the engine and airframe were compatible and that it was flight safe. Product Verification (PV) tests

culminated with a more than 300 hour endurance run prior to production decision.

Avionics Test

Avionics testing primary goals was the demonstration of the integration and performance of "off the shelf" components. Subsystem integration, software validation and equipment prequalification were performed prior to the installation in aircraft 3 for flight tests. The navigation functions was fully demonstrated in a five month program on a C-141 test bed including flights at high latitudes.

Flight Test

Aircraft 1 was to be the primary aircraft devoted to the aerodynamic performance tests. Specific maneuvers were flown throughout the test envelope in order to quantitatively evaluate the flying qualities of the aircraft and flight control system. This testing determined the baseline data for takeoff, climb, cruise, descent, and landing performance of the R&D aircraft and the PFRT engines. This data then could be extrapolated to determine similar performance areas of the production aircraft with PV engines. Armament testing was mostly ground test with limited inflight separation testing. This testing was to demonstrate safe separation of the B-1 primary weapon the Short Range Attack Missile, SRAM.

IOT&E

Air Force Test and Evaluation Centers (AFTEC) responsibilities included an evaluation of the initial operational tests of the B-1 program. AFTEC was involved directly in the flight test of the B-1 and had their own trained

crew members. The Initial Operational Test and Evaluation (IOT&E) was conducted in conjunction with the Development Test and Evaluation (DT&E) effort. The goal of IOT&E is to provide an estimate of the B-1's operational effectiveness and suitability prior to production decision. Throughout the DT&E program, testing was accomplished in the critical mission elements of alert start, launch/base escape, air refueling, navigation, low level penetration, weapon delivery and recovery/landing. In the last portion of the Phase I flight test program an all AFTEC crew flew the B-1 on an "operational mission". This mission included all critical mission elements and lasted approximately eight hours.

In summary, the DT&E Phase I was to accomplish the following ground tests: static design verification of major components, full scale proof loads, engine product verification and at least two life cycles of fatigue testing on major components and inflight test; accomplish partial airloads, demonstrate avionics, do initial operational test and evaluation, and achieve 250-300 flight test hours. Progress on the DT&E program was continuously reviewed within the Air Force through the quarterly Secretarial Program Review (SPR) process. In addition, through the annual Congressional authorization and appropriation hearings, Congress received B-1 testimony on test progress as well as other major facets of the full scale engineering development program. A major update to Congress was included in the testimony to the Senate Armed Services Committee 17 April 1975. Each of the DT&E goals was addressed and current progress in ground and flight testing was recounted to the Committee.

The Congressional FY 76/77 Authorization Bill hearings in the spring of 1975 reviewed the budget which contained the first request for production dollars for the B-1 program. These procurement funds were to be used to purchase long lead materials for the first lot of three production aircraft

with an anticipated go-ahead date of November 1975, one year prior to the production decision (19:5517-5619). The formalized DSARC (III) process for the B-1 was a phased approach beginning with a status review in October 1975 and February 1976 and the final briefing in December 1976.

SECTION IV

B-1 STATUS REVIEWS

Status Review - October 1975

In October 1975, a status review was prepared by the Program Office and presented to the DSARC principals. The attendees included representatives from the following offices: Assistant Secretary of Defense (Installations and Logistics), Assistant Secretary of Defense (Program Analysis and Evaluation), Assistant Secretary of Defense (Comptroller), Director of Research and Engineering, Deputy Director of Test and Evaluation, Cost Analysis Improvement Group and the Air Force. Several representatives were there from the Air Force and the prime speaker was Major General Abner B. Martin, B-1 Program Director.

The briefing was highlighted by two major bench marks of evaluation of the B-1 program which were developed during the full scale development phase, one of these was the derivation of the Starbird criteria which was discussed in the previous section and the second, at the request of the Secretary of the Air Force, the results of an Ad Hoc Management Review of the B-1 program (31:1). The purpose of this one month review concluded in October 1973 was to make a broad, objective management and technical assessment of the entire B-1 Program. The overall direction of the Committee was provided by the Chairman, Raymond L. Bisplinghoff. Two panels were established to review management and technical program data. Each panel consisted of experienced specialists covering the various facets of the B-1 drawn from industry and Government. The conclusion to their report stated, "There is agreement in the Committee that there are no major technical problems which preclude the successful development and production of the B-1 Aircraft." However, key among their report findings was the data in figure 1 which became the criteria

Figure 1

Estimated Percent Variations in Performance Parameters

Performance Parameter	Possible Status	Most Probable Status	Reasonably Adverse
Takeoff Weight	+ 10%	+ 10%	+ 10%
Empty Weight	+ 15%	+ 19%	+ 26%
Max. Refueled Weight	+ 8%	+ 9%	+ 11%
Range			
Subsonic-Variable	- 4%	- 11%	- 20%
Subsonic-Constant	- 6%	- 18%	- 29%
Supersonic-Variable	- 4%	- 9%	- 14%
Takeoff Distance			
Standard Day	+ 15%	+ 15%	+ 15%
Hot Day	+ 13%	+ 13%	+ 13%
Landing Distance	+ 6%	+ 6%	+ 6%
Thrust Margin	+ 6%	- 9%	- 14%
Refueled Altitude	- 12%	- 15%	- 21%

for the B-1 technical performance of the DSARC Milestone III review (26:1-16).

The Starbird criteria and the Bisplinghoff technical assessment were baselines for the B-1 performance. The October 1975 briefing included three major topics; a review of the development program status, the ongoing production planning, and a review of the total program cost estimate (8:a11). Preceding these critical areas was a program overview which examined the course of the program from the days of study contracts in the mid-1960s through DSARC (II) in 1970 and included a discussion of the major change in the development program which occurred during October 1970 to May 1971. The major intent of that program change was to minimize the dollar investment prior to the production decision. With that guideline as much effort as possible was deleted from the development program. In addition, an earlier flight date was required with an improvement in management involvement. This involvement took the form of an innovation in personnel placement, i.e., actually locating program office people at the three associate contractors' facilities. The results of the rephrasing which was known as "Innovations" is in figure 2.

The Development Program status was presented in the context of the production decision program goals (Starbird Criteria) described previously. The summary schedule (figure 3) depicts the development program Phase I effort through the production decision date of November 1976 (8:19). A detailed briefing was presented in each major task area covering the progress from the inception of the program to October 1975.

The second major topic of discussion was production planning. Formal production planning tasks were included in the original scope of work of the full scale engineering development program but were deleted during "Innovations". Limited production planning occurred in-house during the

INNOVATIONS

OCT 1970 - MAY 1971

(DIRECTED BY DEP SEC DEFENSE)

• RESULTS:

	<u>BEFORE</u>	<u>AFTER</u>
• MONTHS TO 1ST FLIGHT	52 (SEP 74)	47 (APR 74)
• NUMBER OF AIRCRAFT	5 + STATIC + FATIGUE	3 + FATIGUE
• NUMBER OF ENGINES	40	27
• FLIGHT TEST HOURS	2000	1105
• AGE & TRNG EQUIPMENT	DESIGN & BUILD	DEFER
• QUALIFICATION	FULL	AIRWORTHINESS
• CONTRACT VALUE		
• ROCKWELL	\$ 1,351M	\$ 1,136M
• GENERAL ELECTRIC	\$ 406M	\$ 383M

Figure 2

DT&E PHASE I

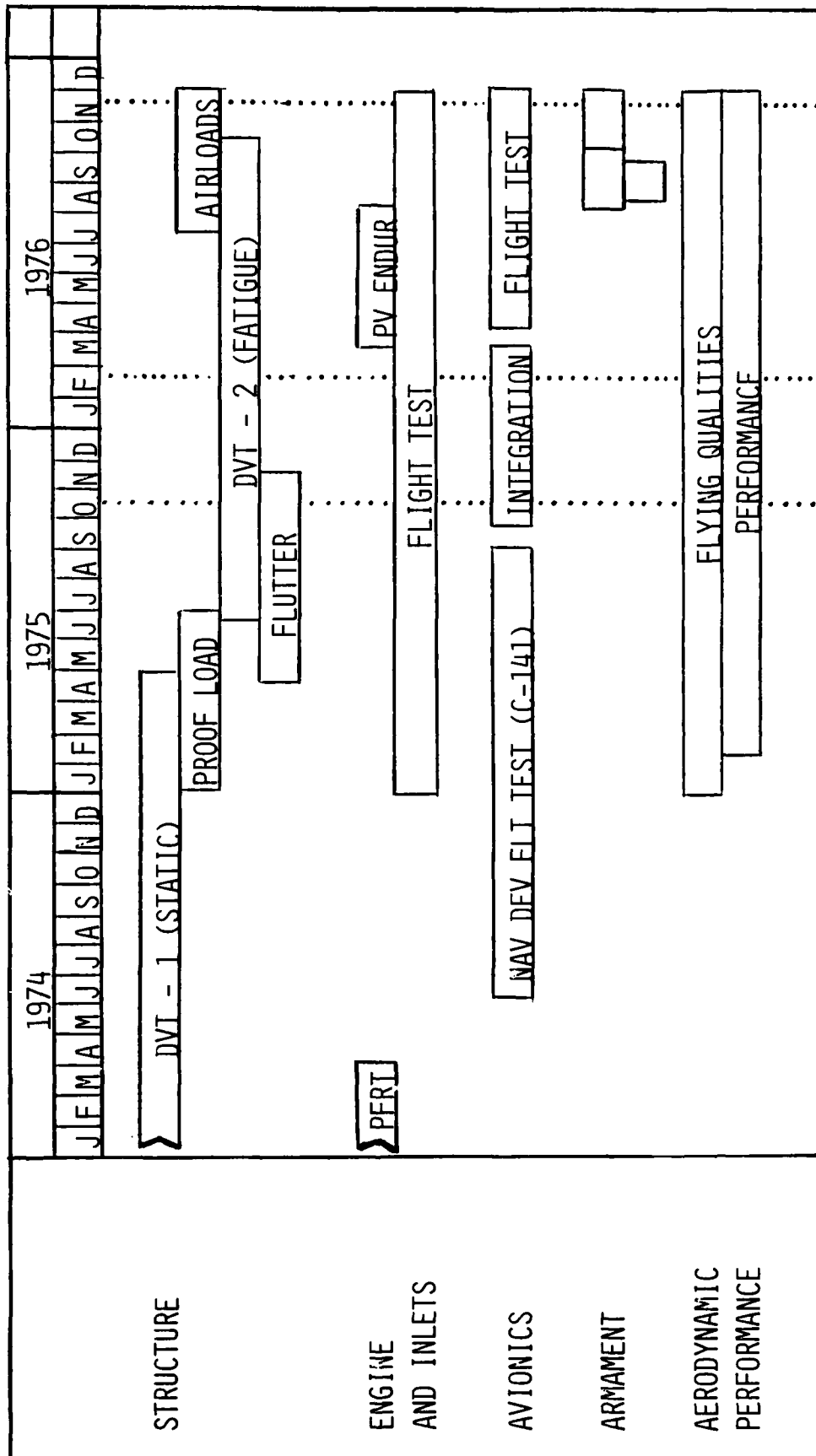


Figure 3

1971 to 1973 time period. With Department of Defense concurrence a production study was done in the fall of 1974 and a similar study during the summer of 1975. The key elements of the production study, Figure 4, were reviewed during this meeting.

The final portion of the review was the total program cost estimate. This included development and program estimates as well as the critical impact that inflation has had and will have on those program estimates.

Congress continued their work on the fiscal 1976 and the transition quarter 1977 military appropriations bill. This bill in final form contained \$87 million for long lead items for production Lot I of B-1s. In their conference report a point was made that authorization of these long lead items was completely independent of the production decision for the B-1. They also noted that the "authorization of long lead funding in no way commits or obligates the United States Government to place the B-1 aircraft into production" (19:6019-6126).

Prior to release of those long lead procurement funds eventually signed into law, the Department of Defense requested another status review of the B-1 program which was in greater depth than the one in October 1975. Not only was this review for the FY 76/77 funds, but it was necessary to reinforce the Department of Defense position regarding the \$1.049 billion B-1 procurement request for fiscal year 1977.

Status Review - February 1976

The purposes set forth for this review was to again look at the development program status as one year of flight testing was completed and aircraft 2 and 3 were approaching manufacturing completion and entry into the test force in the summer. Additionally, it was to determine if progress in other

PRODUCTION STUDY TASKS

- MAKE - OR - BUY
- SUBCONTRACTING
- INDUSTRIAL FACILITIES
- SPECIAL TOOLING AND SPECIAL TEST EQUIPMENT
- ASSEMBLY, INSTALLATION AND CHECKOUT
- MANPOWER
- MANUFACTURING METHODS AND PRODUCIBILITY
- PRODUCTION SCHEDULES AND MANAGEMENT SYSTEMS

Figure 4

key areas was sufficiently acceptable to warrant the Secretary of Defense's support of the program. Lastly, it was to establish an orderly game plan to achieve the scheduled production go-ahead date of November 1976.

The program review was held on 25 February 1976 (Figure 2) with the DSARC principals which were present for the earlier review. All of the principals were there or had representatives attend.

General Martin was again the key speaker.

The development program status covered the major areas of aircraft structural integrity, engine development, flight test and an assessment of predicted performance based upon actual flight test data (9:1-52).

The B-1 structural test program had accomplished more complete testing than on any other previous military aircraft. Static structural tests on components and assembled airframe segments were being completed satisfactorily. Fatigue testing of similar aircraft hardware was well underway with good progress. Fatigue testing to two lifetimes would be accomplished by the November production decision date. In comparison, the F-15 had one lifetime of testing completed at the production decision point and in the commercial aircraft world, the 747, for example, did not begin structural fatigue testing until after production began.

In the area of offensive avionics the mostly "off-the-shelf" equipment had undergone more than three years of laboratory and integration testing. The navigation system had flown in a C-141 test bed with proven satisfactory performance.

The B-1 engines had been running since 1971 and accumulated more than 6,000 hours of testing and had been in flight test more than a year without significant failure.

An assessment of aircraft performance characteristics was included in the flight test section of the briefing based upon 120 flight test hours on aircraft 1. At this point in the program technical performance was exceeding Dr. Bisplinghoff's "most probable" estimates of the key performance parameter-mission range and exceeding the most probable performance estimates in all other areas except landing distances. Critical subsystems such as the electronic multiplexer, the high voltage electrical distribution system, the high pressure hydraulic system and the aircraft center of gravity fuel control system had been flight tested over a year and all were working satisfactorily.

Production program planning was the second major topic of discussion and covered the following areas: make-or-buy, subcontracting, industrial facilities, special tooling and special test equipment, assembly, installation and checkout, manpower, manufacturing methods and producibility, schedules and management system. The schedule for key production readiness reviews was presented and they were to begin in March 1976 and conclude in September 1976. Additional schedules portrayed the path to achieve production contracts through the process of proposal preparation, analysis, negotiation and definitization and the broad range of logistics milestones from 1975. The final topic covered was cost. The confidence in the recent cost estimate was high since it was based upon the actual manufacturing experience of the first three RDT&E aircraft and the developmental engines rather than the parametric estimates used previously.

General Lotz, the Deputy Director of Test and Evaluation, was called upon for comments at the conclusion of General Martin's presentation. The findings of AFTEC were reviewed in detail and General Lotz noted that in the crucial areas of the aircraft's design, the B-1 test data clearly showed that no substantive problems exist. Several minor problems were uncovered

in the development program, however, testing to date indicated that the B-1 would be able to satisfy the strategic mission requirements.

As a result of this review the Deputy Secretary of Defense advised six Congressional Committee chairmen: Armed Services, Appropriations and Budget:

"The purpose of this letter is to make clear the Department of Defense position on the B-1. We have included, in the FY 77 budget, over one billion dollars for the production of the B-1, and we have provided for funding of that aircraft in our out year defense planning. By these actions, the Department of Defense made an explicit commitment to acquire the B-1 bomber."

"The Defense System Acquisition Review Council (DSARC) will conduct its Milestone III review in the fall. It is not a review at which the appropriateness of producing the B-1 is addressed as a new issue. Rather, it is the final step in a continuing process of examination of the progress of the development program. At that point the conclusion of a successful review results in the execution of the production contract." (14:1)

SECTION V

DSARC III - FORMAL PREPARATION

General

The letters to the Congressional Committee Chairmen stated that the Defense System Acquisition Review Council (DSARC) would conduct the Milestone III review in the fall of 1976 (14:1). The date for all things to come together for that review was end of November, coincident with the previous six years of planning and execution of the full scale engineering program.

In order to coordinate a myriad of activities associated with the DSARC III both within the Air Force and the Department of Defense a special office for B-1 headed by a general officer was established in July 1976. Located in the Pentagon and reporting directly to the Air Force Deputy Chief of Staff for Research and Development this focal point orchestrated the activity leading to the DSARC III.

DSARC Principal Visits

The DSARC principals and their staff began visiting B-1 contractors during the summer of 1976. Early staff visits produced in-depth reviews of specific DSARC areas of interest and were preparatory for the later DSARC principals visits. The key player in the DSARC process shifted from the Assistant Secretary of Defense for Research and Engineering to the Assistant Secretary of Defense for Installations and Logistics at the Milestone III decision point.

Among the DSARC staff visits that took place was the Deputy Assistant Secretary of Defense Installation and Logistics (Materiel Acquisition) visit to Rockwell International, Los Angeles, California, in September 1976.

Specific areas of interest were:

1. Production cost reduction activities.
2. Manufacturing technology.
3. Producibility improvement planned for B-1 production.
4. Plans for expansion of plant capacity.
5. Make-or-buy decision rationale.
6. Subcontractor management.
7. System reliability.
8. Production cost estimates.

He was accompanied by a representative from the Secretary of the Air Force (Installations and Logistics) office. Briefers provided information on the requested topics in an essential "give and take" atmosphere. Some additional data was requested and specific items were identified to be addressed in the Air Force presentation to the DSARC.

Another equally important September staff visit was made by a budget analyst of the Office of the Secretary of Defense (Comptroller). Visiting both Rockwell International and the Boeing Company and discussing all aspects of the development program.

After the staff visits the DSARC principals scheduled meetings at two contractor locations; Rockwell International, Los Angeles, California and General Electric, Evendale, Ohio. The basic requirement was to review the contractor data and hear directly from him in specific areas pertinent to the DSARC Milestone III decision. The Rockwell visit was in September 1976 and attendees included: The Director of Defense Research and Engineering, the Assistant Secretary of Defense (Installation and Logistics), the Assistant Secretary of Defense (Comptroller), the Director of Planning and Evaluation, the Deputy Director of Defense Research and Engineering (Test and Evaluation),

the Deputy Director of Defense Research and Engineering (Strategic and Space System) and the Chairman of the Cost Analysis Improvement Group.

The program manager for avionics from the Boeing Company came from Seattle to present an up-to-date analysis of that subsystem development progress.

In early October the DSARC principals gathered at the General Electric Company for an in-depth review of the B-1 engine production system. In addition to the attendees at the Rockwell session, the Deputy Director of Defense Research and Engineering (Propulsion) was present. The contractor briefings were begun by a Vice-President of the General Electric Company followed by nearly four hours of technical, managerial and performance aspects of the F101 engine. Key elements of the briefing centered on the technical problems encountered during the development ground and flight test to date. Inspection of the manufacturing facilities, examination of hardware, and technical questioning by the DSARC principals concluded the days activity.

It was apparent from the DSARC principals reactions and involvement that they left with a thorough background on the B-1 engine development. The successful testing to date was rarely matched by any similar engine development program.

Secretary of the Air Force Involvement

The Secretary of the Air Force advised the Congressional Chairmen of the four critical committees on Appropriations and Armed Services that he was "assuming personal responsibility for the B-1 and instituting several controls which must be passed before I will allow the award of a B-1 production contract." (15:1). These were two major independent efforts commissioned by the Secretary for insuring the B-1 was indeed ready for production. One of them

involved a technical assessment of all aspects of the B-1 program and the other a review of alternative programs.

Technical Assessment

The technical assessment was accomplished under the auspices of the Air Force Scientific Advisory Board. The Ad Hoc Technical Assessment Committee was chaired by Professor Courtland D. Perkins (other members - figure 5) with the objective of reviewing and evaluating the technical aspects of the B-1 development program. A thorough review of the stated performance goals, the analysis of the test program, and the investigation of the proposed solutions to the problems uncovered were collateral objectives of the Committee. Finally, a technical risk assessment was to be accomplished to determine the reasonableness of production entry at this time.

The Committee had two extensive and intensive meetings. The first was at the Pentagon in late September 1976. A major effort during this first meeting was an in-depth technical presentation by Air Staff and Program Office personnel. Key system and subsystem engineers presented data in the entire spectrum of the B-1 development. Detailed briefings highlighted subsystem and critical components lasting for two full days. The major areas covered in the briefing included: operational employment, design requirements, aircraft design, performance, and the continuing development program.

The majority of the data presented was in the area of aircraft subsystem design. Included were structures, avionics and engines as well as the following subsystems: secondary power, fuel handling, hydraulic power (four independent 4,000 psi systems), environmental control, electrical power and distribution (by electronic multiplex) and the central integrated test system.

AD HOC TECHNICAL ASSESSMENT
COMMITTEE

MEMBERS

Prof. Courtland D. Perkins (Chairman)
Mr. Warren E. Anderson
Dr. Alexander H. Flax
Dr. Allen E. Puckett
Brig Gen Emil H. Block
Brig Gen James Dalton

SAB SECRETARIAT

Col James L. Thompson, Jr.
Maj Thaddeus H. Sandford

CONSULTANT

Prof. John F. McCarthy, Jr.
(Chmn, ASD Division Advisory Group)

Figure 5

Current aircraft performance was compared with the Bisplinghoff assessment of 1974.

The second Committee meeting lasted for three days in early October 1976. Traveling to the West Coast it was hosted at the Rockwell B-1 Division facility. The primary briefings were by the B-1 contractors; Rockwell International, the Boeing Company (avionics integration) and the General Electric Company. In addition to a tour of manufacturing facilities at Los Angeles and Palmdale, California, the Committee traveled to Air Force Flight Test Center, Edwards AFB to examine the three B-1 aircraft and to hear a briefing from the independent test team of the Air Force Test and Evaluation Center (AFTEC).

The ad hoc Technical Assessment Committee reported to the Secretary of the Air Force on 7 October 1976 (27:5). The Committee commented on the ability of the B-1 program to benefit from previous aircraft developments specifically in the area of structures and propulsion. The "fly before buy" concept was evident through the timing as well as the duration of the development and the sophisticated scheduling of tests. This then led to an optimization of system performance and an assurance that the "evolutionary" change to the production configuration would not be a "revolutionary" change.

Comparing the empirical data of the current test program to the estimates used in the Bisplinghoff report they had "high confidence" in extrapolating performance characteristics of the production B-1. The empirical data from structural and fatigue test, weight data, engine tests and flight test became the basis for their conclusions.

The Committee's conclusions were:

"1. Many of the subsystems of the B-1, such as the engine and offensive avionics, can be viewed with confidence unusual for a weapon system of this

complexity and at this state of development.

2. There are no apparent technical problems that would prohibit the achievement of a successful production airplane on the proposed time scale.

3. This is a fine airplane of intrinsic versatility which can be exploited for many varied missions currently unidentified.

4. From a technical point of view, the Defense Department can make a production decision on the B-1 with confidence. The final decisions must then deal with other factors." (27:8)

Alternative Programs

In conjunction with the Secretary of Defense the Secretary of the Air Force asked three respected individuals outside the Defense Department to review again the alternatives in the Joint Strategic Bomber Study, dated 1 September 1974, and to determine if the B-1 should be a component of a modern strategic force.

Dr. Michael May (former SALT negotiator), Paul Nitze (former Deputy Secretary of Defense) and Edward David (chairman of the National Security Council Ad Hoc Strategic Panel) evaluated the assumptions, results and alternatives of the Joint Strategic Bomber Study and in a reply to the Secretary of the Air Force, 8 October 1976, concluded that:

"The speed at low altitude, ECM potential, low radar cross section, and hardness of the B-1 provide better assurance of flexibility meeting the range of possible threats than do any of the forces which do not include the B-1. Furthermore, we believe the B-1 can give us these superior capabilities at comparable cost and at an earlier date than any other system suggested." (1:1)

It was their opinion that aircraft, with their armaments are an essential element of an adequate strategic nuclear deterrent. They also recognized the number of "years" it takes to deploy an operational strategic system and that

the B-1 had achieved demonstrated capabilities leading to its inclusion in the strategic forces (1:2).

General Officer Steering Group

This group of Generals was the Air Force's "designated hitter" for DSARC. Any specific or peculiar problem which might arise during the course of events leading to the DSARC was to be acted upon through this Steering Group or through the B-1 focal point on the Air Staff. The General in charge of that B-1 office was also a member of the Steering Group.

Some of the areas in which the Steering Group was involved were production readiness and logistics. Group members traveled to the program office and contractor sites to review cost, schedule and production readiness. The main area of interest was production planning; production planning background, actual plans, transition details, make-or-buy, facilities, and production readiness reviews.

Parallel Activity

Independent Cost Analysis

DSARC principals, special committees, and steering group people traveled and reviewed the B-1 data and cost was always a major area of interest. In response to a major management objective of the DSARC to review total program cost, an Independent Cost Analyses (ICA) was accomplished.

The ICA was directed by the Comptroller of the Air Force to support the Cost Analysis Improvement Group of OSD and to test the reasonableness of the program office estimates. The ICA team was composed of 26 people from Hq USAF, Hq Air Force Systems Command (AFSC), Aeronautical Systems Division of

AFSC, Air Force Logistics Command, Strategic Air Command and Air Training Command. They gathered data from the B-1 contractors, the Air Force Flight Test Center, current B-1 estimates, and used historical data (4:1-3).

Their estimates included discretely for completing the development program presently on contract, the follow-on development work, Lot I of production aircraft (5 through 7) and the remaining production 8 through 244 (4-6).

The ICA also included an estimate for 20 years operation and support of the B-1 total weapon system. This estimate is based upon a full force inventory of aircraft, personnel and equipment at mature steady state operation. Thus, the DSARC principals were provided the necessary tool for expenditure planning for the long term. The basis of comparisons for this operating and support estimate are the current B-52 and FB-111 empirical cost data.

As a result of the independence required for an objective estimate, the ICA team was constituted separate from the program office with no team member who participated in the latest program office estimate. The current ICA was compared against previous ICA estimates and the program office estimates within the basic areas of learning curves and their derivation, labor, overhead and G&A rates and most importantly escalation. The ICA report contained a detailed risk assessment which included; a sensitivity analysis of critical assumptions, program uncertainties, and risk associated with estimating techniques and cost methodology.

The ICA was prepared during July and August of 1976 and presentation of the results began during mid-September. The entire chain of command was briefed which included the Aeronautical Systems Division (AFSC) Commander, the AFLC Vice-Commander, Commander AFSC, the Hq USAF/CAIG, the Secretary of the Air Force/Financial Manager, Air Force Comptroller and the Hq AF/Deputy Chief of Staff for Research and Development, and the OSD/CAIG. The report presented

to the OSD/CAIG became the data base for their analysis of B-1 cost to be used in support of their portion of the DSARC Milestone III.

Required Operational Capability (ROC)

The operational need was reaffirmed by Strategic Air Command in an updated ROC submitted in September 1976. Its basic premise was that "a modern manned bomber is required to stop the decline in our strategic force effectiveness and provide the National command authority with flexible, responsive options." (28:) The ROC describes an advanced manned strategic aircraft that is flexible across the entire spectrum of conflict, from a show of National resolve to general nuclear war. The aircraft must be compatible with all existing and future categories of weapons, have intercontinental range and capable of refueling inflight.

An accompanying document also prepared by SAC is the B-1 Concept of Employment, August 1976. This document described the operational considerations in the deployment and employment of the B-1. Emphasis was placed on tactics applicable to an advanced manner bomber and major concepts discussed included; deployment, operational readiness, employment and penetration (2: 4-6). This information was available at the Air Staff for review by the DSARC principals or their staff representatives.

Program Office Activity

The program office was deeply involved with the conduct of the full scale engineering development program as the DSARC Milestone III approached.

Engineering

The major thrust of the engineering directorate was the daily review of

accomplishments in critical areas of the development program such as; static and fatigue structural test, engine product verification test, avionics test and flight test. In addition to these major task areas the development of the Environmental Impact Statement (EIS) was led by the Engineering Directorate. The report described the B-1's relationship to the environment in air pollution, stratospheric flight, noise, sonic boom, accidents, social and economic effects, manufacturing, electromagnetic radiation and secondary effects of ground refueling, engine test and air base facilities. The statement was completed and submitted on 24 September 1976.

Logistics

Another parallel effort for support of the DSARC process was the preparation of the B-1 Integrated Logistics Support Plan (ILSP). Recognizing that logistics support is an integral part of the B-1 system life cycle, the ILSP describes the effort accomplished and that logistics support capability programmed for the B-1 aircraft.

The B-1 development program was oriented to research and development, thus the task of logistics support was deferred until an identifiable commitment to production was established. Logistics support planning was conducted during 1970-1974 and at this time support equipment long lead items were ordered. Further step function augmentations to logistics planning included the Technical Order Publications Plan (TOPP) and a Facilities Requirements Plan (FRP) in 1975 and a Support Equipment Acquisition Plan (SEAP) in June 1976. The basic maintenance engineering analysis, comprehensive logistics planning, identification of long lead support equipment and the plans mentioned previously provided a solid planning from which began the development and acquisition of logistics support resources.

The basic philosophy of the acquisition of B-1 logistical support was to contract for items lead time away from need.

The basic advantage of that philosophy is that funds are not expended until a need exists and maximum time is allowed for system and subsystem design stabilization. Lessons learned from other programs indicated that deferring logistic support hardware development until a majority of the design has stabilized is a cost-effective approach (6:7).

The ILSP expanded upon the approach to B-1 logistic support in ten major areas. Using the ILSP as the baseline planning document and a comprehensive statement of the logistic support program these ten areas; Maintenance, supply support, support and test equipment, technical data, packaging and handling and transportation, support facilities, personnel, logistics training, modification management plan, and software support plan (6:3).

The plan was prepared by the program office Deputy Program Manager for Logistics with reviews by AFLC, the operating command, SAC, and Air Staff. Once finalized it was formally submitted to the Deputy Chief of Staff for Installation and Logistics and forwarded to the Assistant Secretary of Defense (Installations and Logistics) to be used in support of the DSARC Milestone III decision.

Production

As a part of the process of determining whether the B-1 aircraft should be recommended for authorization of production, the Air Force evaluated the production planning efforts of the associate contractors developing the B-1 aircraft. This was accomplished through a series of Production Readiness Reviews (PRRs). The program office conducted nine PRRs since March 1976. These reviews were performed to determine the state of readiness of the B-1

associate contractors for carrying out an orderly transition of the B-1 program from full scale development to production. The principal focus of the reviews has been directed toward assuring that the B-1 aircraft has achieved an acceptable level of design stability and obtaining direct, objective evidence that adequate production planning efforts have been satisfactorily completed.

The B-1 Production Readiness Reviews were tailored to fit each contractor's product environment within a general set of guidelines used for structure of all reviews. Reviews were conducted incrementally, following the contractor planning of long lead time production tooling, acquisition of materials required for the first production order, and necessary associated production transition planning activities. Four PRRs were conducted at Rockwell International, three were conducted at Boeing, two were conducted at General Electric (17:3). The areas covered in the reviews were quite comprehensive in order to provide assurance that all critical areas affecting a successful transition to a production phase were addressed in adequate scope and depth. The major areas reviewed in the PRRs involved: engineering design and configuration management; manufacturing planning, scheduling and control; "make" versus "buy", subcontracting and material procurement; capital facilities (both Air Force and contractor-funded); manufacturing engineering and tooling; special tooling and test equipment; manufacturing management systems; property management and logistics; quality assurance and producibility engineering.

In addition to readiness reviews accomplished by the Air Force PRR team, independent assessments were undertaken by other groups, including several by experts from the Department of Defense Product Engineering Services Office. Their assessment confirmed the conclusions of the Air Force reviews and

provided a report of their findings directly to the Office of the Secretary of Defense. In addition, the B-1 associate contractors conducted production readiness reviews at major and critical subcontractors. The Air Force also participated in these reviews.

Highly qualified specialists from a wide variety of DOD organizations were used to accomplish the Production Readiness Reviews. They represented the Air Force Materials Laboratory, Defense Contract Audit Agency, Hq Air Force Systems Command, Aeronautical Systems Division and Hq Air Force Contract Management Division (17:4). These people augmented the specialists from the B-1 System Program Office and conducted one of the most comprehensive and exhaustive examinations of contractor production readiness ever accomplished for a new weapon system prior to production decision.

Test

The FSED flight test program was nearing completion during early fall of 1976. The basic data gathered during the flight test program centered in these areas: aerodynamic performance; specific maneuvers were flown throughout the test envelope to quantitatively evaluate flying qualities, aircraft/engine performance; data was gathered in areas of takeoff, climb, cruise, descent and landing mission elements; offensive avionics integration; demonstrations of navigation performance and weapons delivery accuracy were evaluated in the operational flight environment. The culmination of the flight testing was two initial operational test flights by the Air Force Technical Evaluation Center crew. These IOT&E flights included alert start, launch/base escape, air refueling, navigation, low level penetration, weapon delivery and recovery/landing elements. Analysis of the flight test data was utilized to determine the performance characteristics of the

production configuration B-1 aircraft in support of the DSARC Milestone III.

Procurement

The Procurement contracts for Lot I of three B-1 aircraft were negotiated in a timeframe coincident with the DSARC process. The major milestones for that effort were as follows:

Contract Milestones

EVENT	DATE		
	<u>Boeing</u>	<u>Rockwell</u>	<u>GE</u>
RFP Released	May 76	Mar 76	Mar 76
Proposal Received	Jul 76	Jul 76	Sep 76
Proposal Evaluated	Aug 76	Aug 76	Sep 76
Fact-Finding/Negotiations Complete	Oct/Nov 76	Oct/Nov 76	Sep 76
Contract Signature	Dec 76	Dec 76	Dec 76

Figure 6

The preceeding schedule was applicable to the three sole source efforts to be awarded to Rockwell International, the Boeing Company and General Electric after completion of DSARC III. These procurements were incorporated into the long lead material contracts awarded earlier in 1976 to each contractor. Contractor authorization to proceed in the late November-early December time period was critical to preserve the overall production schedule. Production planning was structured to minimize the gap between full scale development and production deliveries and to provide the most economical transition to

production (22:2).

The most critical contract was with the Rockwell Corporation. Their proposal was received by 30 July 1976 and fact-finding and analysis were conducted through September 1976. Continuous negotiations were conducted through September 1976. Continuous negotiations were conducted from September through November 1976. Contracts were negotiated and signed by the associate contractors on the above schedule.

Financial Management

Program Control

In support of the production decision, the Financial Management Division of Program Control developed total program cost estimates. The impact of inflation is a substantial factor in the calculations of cost for a program such as the B-1 because of the extremely long duration of the program. The production program was planned to last until 1986. The first major task in estimating the program was the determination of the appropriate escalation factors. The program Financial Management Division of Program Control completed an "Escalation Study" in August 1976. Escalation factors were determined for the two major cost areas of the program - research and development (R&D) and production. The R&D factors were based upon contractor empirical data for labor and material escalation (3:3). The program office performed an analysis to derive the functional element (structure, propulsion, avionics, etc.) composite factors. The Aeronautical Systems Division Cost Research Report production factors were used as the baseline values. Through the use of detailed automated programming the program office evaluated the relative magnitude of contractor expenditure patterns

for recurring, nonrecurring, engineering change order, long lead and peculiar support categories (3:8). The basic program is run on the General Electric Project Copper Impact Information Services computer system (3:i).

This data then was used in the program office cost estimates. To the extent possible R&D and production estimates were built up from a "grass roots" or functional basis. The compilation of data and the estimating process was accomplished during a concentrated sixty day effort in preparation for the budget submission and the DSARC III.

Plans and Documentation

Program Control

During August and September 1976 the Plans and Documentation Division of the B-1 Program Control Directorate began the compilation of data necessary to build the DSARC III briefing to be given by the Program Director. Using the October 1975 and the February 1976 status reviews as a baseline, the briefing was organized to present an objective and quantitative appraisal of the development program accomplishments and current status.

The briefing which was compiled addressed the basic history of the program to familiarize the audience with the development program. Extensive reshaping of the program by the Department of Defense and the Air Force had removed large quantities of work and deferred them until after production decision to minimize the resources expended. In addition, Congressional budget reductions also caused the program restructuring.

One major portion of the briefing covered the full scale development program and demonstrated that the production decision goals set forth by the Department of Defense had been achieved. The second major briefing

segment discussed the production program including production plans, schedules, make-or-buy, competition considerations, facilities, manufacturing methods, manpower and a full discussion of the production readiness reviews. The content of the negotiated production contracts was also included in the presentation. Logistics and cost wrapped up the briefing which was to be presented to the DSARC principals.

Throughout the DSARC process there remained a single focal point within the Program Office which orchestrated the briefings and visits of the myriad of people reviewing the program.

SECTION VI

THE DSARC BRIEFING

An unplanned event took place after the DSARC principals' visits to the B-1 associate contractors. In a Memorandum for the Secretary of the Air Force, the Deputy Secretary of Defense outlined an additional briefing required for the DSARC review. In a briefing to the DSARC principals on 12 October 1976, these additional "issues" were covered: a full description of the defensive avionics program; a description, planning, and status of the B-1 ground support equipment; plans for electromagnetic pulse testing; and a discussion and resolution of points raised at previous meetings such as: base escape time and range (33:1). The memo from the Secretary also described the final DSARC briefing as covering all remaining technical items and a review of the detailed costs and cost projections that come out of solidly definitized production contracts. Also, the Deputy Secretary of Defense appointed himself as the "Chairman of the Production DSARC for this large and important program." (33:1)

The interim DSARC briefing on the specific issues was presented on 12 October 1976 and during the last half of October and November 1976 the DSARC principals analyzed their findings while the Program Office and the contractors concluded the work effort to satisfy the production decision criteria. These last items of work included; IOT&E flights, completion of fatigue structural test, and the completion of contract negotiations.

The final DSARC meeting took place on 1 December 1976 with the Assistant Secretary of Defense (International Security Affairs) acting as Chairman as a result of the hospitalization of the Deputy Secretary of Defense. Preliminary meetings had been held with the Assistant Secretary

to provide as much program information as possible to him. Following the presentations from all participants DSARC principals entered executive session.

On 2 December 1976 after a morning session with the Defense Acquisition Review Council the Secretary of Defense issued a Memorandum for the Secretary of the Air Force:

"I have reviewed the results of the B-1 DSARC process concluded on 2 December 1976. The DSARC's findings were that the development, test, and production planning prerequisite to B-1 production have been satisfactorily accomplished. Their recommendation is that the B-1 is ready to move into production. Accordingly, the Air Force is authorized to proceed with the production of the B-1." (23:1).

SECTION VII

SUMMARY

General

There are several key elements to a successful preparation for any DSARC. The experience of the B-1 can be useful in this regard by examining some of the tasks which made the favorable production decision a priority decision. The planning and execution of years of work is wrapped into a review which takes only several hours. However, the real DSARC decision process is an evolutionary one.

Involvement

A major ingredient of any program is the early involvement of all the important team members. Throughout the full scale engineering development of the B-1, all levels of the government were aware of the current status of the B-1 program. The formal process of quarterly Secretarial Performance Reviews (SPR) and the Selected Acquisition Reports (SAR) kept everyone informed. The Office of the Secretary of Defense functional staffs in logistics, test and finance visited the program office and associate contractor sites and thus were deeply involved in the program. Congressional staff members also visited the same places and throughout the years of the program became extremely knowledgeable and were welcomed to a "give and take" environment of teamwork for National Defense.

Within the Air Force teamwork was also the key. The user, Strategic Air Command, had personnel located in the program office. The Logistics Command was equally represented by a Deputy Program Manager for Logistics.

Testing was accomplished throughout the Air Force network of test centers with a Joint Test Force for flight test located at Edwards Air Force Base. The Air Force Test and Evaluation Center, the independent tester, was brought aboard early in the program. Their crew members were trained along with contractor and test center pilots and systems operators.

Production Decision Criteria

The establishment of a baseline to measure the performance achieved in FSED is necessary so that all parties know what the goals of the full scale engineering program are. The criteria were established in conjunction with the Department of Defense DSARC principals as well as the Secretary of the Air Force and then communicated to Congress through the "hearings" process. They provided the goals to the program manager by which he could measure the progress of his program along the three major parameters of cost, schedule, and technical performance.

Production Readiness Reviews

The reaction of the Product Engineering Services Office (PESO) of the Department of Defense was highly favorable toward the organization and conduct of these reviews. Repeated reviews at each of the associate contractor facilities by a composite team of experts assured that the contractors understood the government requirements and demonstrated their ability to meet those requirements. It also prompted the associates to conduct similar reviews of their major subcontractors.

The composite team of Air Force and OSD personnel conducted thorough reviews whose format and procedure provide a model for future production readiness reviews in the Air Force and possibly in all the Services.

APPENDIX A

POST SCRIPT

The Air Force contracts for production of the B-1 contained the phased funding originally required by the FY 77 Appropriations Act through January 1977. In addition, Hq Air Force developed similar funding provisions through June 1977 with the express purpose of providing the incoming Administration an opportunity for additional assessment of the B-1 production program prior to fully funding the contract.

On 30 June 1977, President Jimmy Carter announced, "I am directing that we discontinue plans for production..." of the B-1 bomber. "The existing testing and development program now underway for the B-1 should continue to provide us with the needed technical base."

As the basis for his decision, the President announced: "...that in toto the B-1, a very expensive weapons system basically conceived in the absence of cruise missile factor, is not necessary." Thus, President Carter acknowledged that the bomber leg of the Triad can be accomplished by the B-52 as a stand-off weapon utilizing the cruise missile.

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